Remarks

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 1 and 3-7 are pending in the application, with 1 being the independent claim. New claim 7 is sought to be added. Support for the amendment to claim 1 is found in the specification at page 2, line 33-35. Support for claim 7 is found in the specification at page 4, lines 11-13. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

Information Disclosure Statement

Applicants note that the Examiner has not indicated that he has considered the references cited on the Information Disclosure Statement filed July 12, 2005. Applicants request that an initialed Form PTO-1449 be returned to indicate that the references have been considered.

Rejections Under 35 USC § 102

Claims 1 and 3 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Mandecki (U.S. Patent No. 6,046,003). (Office Action, page 3). Applicants respectfully traverse this rejection.

The Examiner is of the opinion that:

> Mandecki teaches a method for producing a labeled nucleic acid (e.g., fluorescently-labeled target DNA bound to probe attached to the surface of the transponder), wherein the method comprises binding the nucleic acid (e.g., oligonucleotides) to a large scale integrated circuit (e.g., solid phase particles having a transponder associated with each particle), and recording specific information (e.g., the sequence of the oligonucleotide) on the large scale integrated circuit (column 1, lines 55-column 2, line 6, column 17, lines 28-44).
>
> With regard to claim 3, Mandecki teaches a method wherein a substrate (e.g., monoisocyanate) mediates the binding of a nucleic acid to the large scale integrated circuit (column 8, lines 21-45).

(Office Action, pages 3-4). Applicants respectfully disagree.

Claims 1 and 3 as amended are directed to an LSI that comprises more than 320 million bits of memory. Mandecki states at column 5, lines 33-60 that transponders used in their method are, for example, (i) model# IPTT-100 (Bio Medic Data Systems, Inc.) which is user-programmable with up to 16 alphanumeric characters, (ii) a multi-memory electronic identification tag manufactured by AVID Corporation which can encode 96 bits of information, and (iii) TEMIC-Telefunken's system. Memory sizes of these transponders are several orders of magnitude smaller than the LSI of the present claims. Because Mandecki does not teach the use of LSIs that comprise more than 320 million bits of memory as is required in the present invention, Mandecki does not disclose every element of the claimed invention and thus does not anticipate the claims.

It is respectfully requested that the rejection of claims 1 and 3 over Mandecki be withdrawn.

Claims 1 and 3 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Moran *et al.*, *J. Am. Chem. Soc. 117*:10787 (1995). (Office Action, page 4). Applicants respectfully traverse this rejection.

The Examiner is of the opinion that:

> Moran teaches a method of producing a labeled protein (see page 10787, column 2 where specific peptides were attached to the surface of the transponder), wherein the method comprises binding the protein to a large scale integrated circuit (see page 10787, column 1, where a transponder is associated with each peptide), and recording specific information that is characteristic of the peptide (e.g., the sequence of the peptide, see page 10787, column 2 and see supplementary information page 3) on the large scale integrated circuit (see page 10787, column 1 and supplementary information page 3).
>
> With regard to claim 3, Moran teaches a method wherein the peptide is bound to the large scale integrated circuit via a resin (see page 10787, column 2).

(Office Action, page 4). Applicants respectfully disagree.

The IMI transponder used in Moran *et al.* is a "read only" transponder that transmits a 10-digit alphanumeric code for use in identification. (See product information sheet for IMI-1000 transponder attached hereto). Moran *et al.* do not (and cannot) record any information characteristic of the attached peptides on the transponder. Instead, Moran *et al.* record the location of the transponder each time an amino acid is linked directly to the transponder or to the growing peptide chain. Moran *et al.* then download the location information onto a computer and use the location information to determine the sequence of the peptide attached to the transponder. Specifically, at page 10787, column 2, lines 24-28, Moran *et al.* clearly describe that the pool location of each capsule during peptide synthesis was recorded via scanning of its RF transponder code, and the codes were uploaded to a PC database program. This means that the only information contained in the transponder of Moran *et al.* is its identification code, and the actual sequence of a peptide synthesized on each transponder (*i.e.*, the record of to which pool and in what order the transponder has been distributed) is recorded on a PC

database program. This point is also clear from the description at page 3, lines 6-11 of the supplementary information.

In contrast, the present invention is directed to a method for producing a labeled gene or protein, wherein the gene or protein is bound to an LSI and specific information that is characteristic to the gene or protein is recorded on the LSI. The method disclosed in Moran *et al.* does not involve the recording of specific information that is characteristic of the bound gene or protein on an LSI. Thus, Moran *et al.* do not disclose every element of the claimed invention and cannot anticipate the present claims.

It is respectfully requested that the rejection of claims 1 and 3 as being anticipated by Moran *et al.* be withdrawn.

Claims 1, 3, and 5 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Nova *et al.* (U.S. Patent No. 5,741,462). (Office Action, page 5). Applicants respectfully traverse this rejection.

The Examiner is of the opinion that:

> Nova teaches a method for producing a labeled protein or gene (see abstract), wherein the method comprises binding the protein to a large scale integrated circuit (see column 29, line 45 to column 30, line 14, where antibodies are bound to the integrated circuit), and recording specific information that is characteristic of the peptide (see column 29, lines 50-55 where each antibody "is given a specific identification tag") on the large scale integrated circuit (see columns 29 and 30).
>
> With regard to claim 3, Nova teaches a method wherein the peptide is bound to the large scale integrated circuit via a linker (see column 18, line 10, for example).
>
> With regard to claim 5, Nova teaches an antibody mediates binding of a protein to the integrated circuit (see columns 29-30).

(Office Action, page 5). Applicants respectfully disagree.

Claims 1, 3, and 5 as amended are directed to an LSI that comprises more than 320 million bits of memory. Nova *et al.*, in the only description of the memory capacity of the transponder used in their method, indicate that "in a preferred embodiment the finished chip on which all of the listed components are integrated is on the order of 1 mm x 1 mm . . . with a memory capacity of 1024 bits." (Column 21, lines 8-16). Nova *et al.* continue to state that "greater memory capacity, where needed, and smaller chips, however, will be preferred," and also state that "[i]nformation to be written into the memory need not be detailed since the data stored in the memory is primarily acting as an identification marker that is traceable to a more detailed record stored in the host computer memory 120, independent of the memory associated with the matrix support or tagged molecule or biological particle." (Column 21, lines 60-65).

The teachings of Nova *et al.* are limited to transponders having relatively small memory of around 1000 bits, and they explicitly states that detailed information of labeled molecule need not to be recorded on the memory of transponder. In contrast, the present claims are drawn to methods using LSIs containing several orders of magnitude more memory. Moreover, the methods of the present invention directly record information characteristic of a labeled molecule on a LSI and do not require an external host computer for this purpose. Rather, the claimed methods utilize a LSI having large memory size (*i.e.*, more than 320 million bits), thereby enabling the recordation of detailed information of a labeled molecule within the LSI. Thus, Nova *et al.* do not disclose every element of the claimed invention and cannot anticipate the present claims.

It is respectfully requested that the rejection of claims 1, 3, and 5 over Nova *et al.* be withdrawn.

Rejections under 35 U.S.C. § 103

Claim 4 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Mandecki (U.S. Patent No. 6,046,003) in view of Stavrianopoulos *et al.* (U.S. Patent No. 4,994,373). (Office Action, page 6). Applicants respectfully traverse this rejection.

The Examiner is of the opinion that:

> Mandecki teaches a method for producing a labeled nucleic acid (e.g., fluorescently-labeled target DNA bound to probe attached to the surface of the transponder), wherein the method comprises binding the nucleic acid (e.g., oligonucleotides) to a large scale integrated circuit (e.g., solid phase particles having a transponder associated with each particle), and recording specific information (e.g., the sequence of the oligonucleotide) on the large scale integrated circuit (column 1, lines 55-coloumn 2, line 6, column 17, lines 28-44). . . .
>
> Stavrianopoulos teaches attachment of nucleic acids to plastic matrices (see column 12, lines 5-15, for example).
>
> It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to use the epoxy resin of Stavrianopoulos to attach the nucleic acids of Mandecki since Stavrianopoulos notes "An improved capability for fixing or immobilization of DNA to non-porous siliceous solid supports, such as glass and plastic, is also provided by treatment with a coating of an epoxy resin. (see column 12, lines 5-15)". An ordinary practitioner would have been motivated to use the epoxy resin of Stavrianopoulos in order to improve the ability of the DNA to be fixed to the plastic solid supports of Mandecki as expressly suggested by Stavrianopoulos.

(Office Action, pages 6-7). Applicants respectfully disagree.

As discussed above, Mandecki does not teach a method for producing a labeled gene or protein, comprising binding the gene or protein to an LSI that comprises more

than 320 million bits of memory. The teachings of Stavrianopoulos *et al.* do not cure the deficiencies of Mandecki. Stavrianopoulos *et al.* simply teach a method for using a probe that has been labeled with an enzyme or such to quantitatively detect target polynucleotide within a sample, and do not teach or suggest using "information" as a label. Stavrianopoulos *et al.* say nothing about the use of LSIs. Thus, even if the teachings of Mandecki and Stavrianopoulos *et al.* were combined, one of ordinary skill in the art could not have arrived at the currently claimed method.

It is respectfully requested that the rejection of claim 4 over Mandecki in view of Stavrianopoulos be withdrawn.

Claim 4 has been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Nova *et al.* (U.S. Patent No. 5,741,462) in view of Stavrianopoulos *et al.* (U.S. Patent No. 4,994,373). (Office Action, page 6). Applicants respectfully traverse this rejection.

The Examiner is of the opinion that:

> Nova teaches a method for producing a labeled protein or gene (see abstract and column 11, lines 62-64), wherein the method comprises binding the protein to a large scale integrated circuit (see column 29, line 45 to column 30, line 14, where antibodies are bound to the integrated circuit), and recording specific information that is characteristic of the peptide (see column 29, lines 50-55 where each antibody "is given a specific identification tag") on the large scale integrated circuit (see columns 29 and 30). . . .
>
> Nova teaches a variety of synthetic plastic matrices as substrates at column 17, but Nova does not teach the specific substrates of claim 4.
>
> Stavrianopoulos teaches attachment of nucleic acids to plastic matrices such as those of Nova using epoxy resin (see column 12, lines 5-15, for example).
>
> It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made

> to use the epoxy resin of Stavrianopoulos to attach the nucleic acids or proteins of Nova since Stavrianopoulos notes "An improved capability for fixing or immobilization of DNA to non-porous siliceous solid supports, such as glass and plastic, is also provided by treatment with a coating of an epoxy resin. (see column 12, lines 5-15)". An ordinary practitioner would have been motivated to use the epoxy resin of Stavrianopoulos in order to improve the ability of the DNA to be fixed to the plastic solid supports of Nova as expressly suggested by Stavrianopoulos.

(Office Action, pages 7-8). Applicants respectfully disagree.

As discussed above, Nova *et al.* do not teach a method for producing a labeled gene or protein, comprising binding the gene or protein to an LSI that comprises more than 320 million bits of memory. The teachings of Stavrianopoulos *et al.* do not cure the deficiencies of Nova *et al.* Stavrianopoulos *et al.* simply teach a method for using a probe that has been labeled with an enzyme or such to quantitatively detect target polynucleotide within a sample, and do not teach or suggest using "information" as a label. Stavrianopoulos *et al.* say nothing about the use of LSIs. Thus, even if the teachings of Nova *et al.* and Stavrianopoulos *et al.* were combined, one of ordinary skill in the art could not have arrived at the currently claimed method.

It is respectfully requested that the rejection of claim 4 over Nova *et al.* in view of Stavrianopoulos be withdrawn.

Conclusion

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the

outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment and Reply is respectfully requested.

Respectfully submitted,

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